

IN THE CLAIMS

This listing of claims replaces all prior listings:

1. (Currently amended) A non-aqueous electrolyte secondary battery comprising:
a band-shaped positive electrode, ~~a non-aqueous electrolyte~~ at least one separator made of
a polypropylene microporous film, and a band-shaped negative electrode, the negative electrode
comprising a graphite containing material, wherein:

(1) the relationship $G_s = H_{sg}/H_{sd} \leq 10$ holds for the negative electrode,
wherein G_s is being the degree of graphitization, H_{sg} is being the height of
a surface enhanced Raman spectrum signal having a peak within the range of 1580 cm^{-1} to 1620
 cm^{-1} , both inclusive, and H_{sd} is being the height of a surface enhanced Raman spectrum signal
having a peak within the range of 1350 cm^{-1} to 1400 cm^{-1} , both inclusive;

(2) said graphite containing material comprises graphite particles having
structural differences between an inside of the particles and an outermost surface of the
particles[(:)]; and

(3) said graphite containing material is further characterized by[(:)]

(a) the graphite particles having a rhombohedral structure[(:)],

(b) exhibiting at least two separate peaks on a differential
thermogravimetric curve as obtained by thermogravimetric analysis in an
airflow[(:)], and

(c) the outermost surface of the graphite particles exhibiting a weight
reduction as measured by a differentiation of the thermogravimetric curve
of at least 5% and at most 40% relative to the inside of the particles;

(4) the negative electrode is pressed such that the specific surface area is increased by at least 2.5 times that of the specific surface area before being pressed; and

(5) the band-shaped positive electrode, one of the at least one separators, the band shaped negative electrode and a second of the at least one separators are stacked together in that order.

2. (Canceled)

3. (Currently Amended) A non-aqueous electrolyte secondary battery comprising:

a band-shaped positive electrode, a band-shaped negative electrode, at least one separator made of a polypropylene microporous film and a non-aqueous electrolyte,

wherein,

the negative electrode contains graphite containing material,

said graphite containing material comprising graphite particles having structural differences between an inside of the particles and an outermost surface of the particles, wherein said graphite containing material is characterized by a saturated tapping density of 1.0 g / cm^3 or more, and

~~wherein~~ the outermost surface of the graphite particles exhibits a weight reduction as measured by a differentiation of a thermogravimetric curve as obtained by thermogravimetric analysis in an airflow of at least 5% and at most 40% relative to the inside of the particles,

the negative electrode is pressed such that the specific surface area is increased by at least 2.5 times that of the specific surface area before being pressed, and

the band-shaped positive electrode, one of the at least one separators, the band shaped negative electrode and a second of the at least one separators are stacked together in that order.

4. (Currently amended) A non-aqueous electrolyte secondary battery comprising:
a band-shaped positive electrode, a band-shaped negative electrode, at least one separator made of a polypropylene microporous film, and a non-aqueous electrolyte, wherein,
(1) the negative electrode contains a graphite containing material, wherein said graphite containing material comprises graphite particles having structural differences between an inside of the particles and an outermost surface of the particles; and;

(2) said graphite containing material is characterized by[[:]]

- (a) a packing characteristic index of 0.42 or more,
- (b) the graphite particles having a rhombohedral structure, and
- (c) the outermost surface of the graphite particles exhibiting a weight reduction as measured by a differentiation of a thermogravimetric curve as obtained by thermogravimetric analysis in an airflow of at least 5% and at most 40% relative to the inside of the particles;

(3) the negative electrode is pressed such that the specific surface area is increased by at least 2.5 times that of the specific surface area before being pressed; and

(4) the band-shaped positive electrode, one of the at least one separators, the band shaped negative electrode and a second of the at least one separators are stacked together in that order.

5. (Currently amended) A non-aqueous electrolyte secondary battery comprising:

a band-shaped positive electrode, a band-shaped negative electrode, at least one separator made of a polypropylene microporous film, and a non-aqueous electrolyte,

wherein,

the negative electrode contains a graphite containing material, said graphite containing material comprising graphite particles having structural differences between an inside of the particles and an outermost surface of the particles,

said outermost surface of the graphite particles exhibiting a weight reduction as measured by a differentiation of a thermogravimetric curve as obtained by thermogravimetric analysis in an airflow of at least 5% and at most 40% relative to the inside of the particles,

the negative electrode is pressed such that the specific surface area is increased by at least 2.5 times that of the specific surface area before being pressed, and

the band-shaped positive electrode, one of the at least one separators, the band shaped negative electrode and a second of the at least one separators are stacked together in that order.

6. - 14. (Canceled)

15. (Withdrawn) A method of preparing a carbon-based material for a negative electrode including steps of:

I. mixing a coating material made of one of pitch containing free carbon, pitch with a quinoline insoluble matter content of 2 % and more, or polymer with a carbon-based material

made of at least either one of mesocarbon microbeads grown at a temperature within the range of the formation temperature to 2000 °C, both inclusive, and a carbon material; and

II. graphitizing the carbon-based material with which the coating material is mixed.

16. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15 including a step of: applying a heat treatment to the carbon-based material in an oxidizing atmosphere before graphitization.

17. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15 including a step of: performing an oxidation treatment on the carbon-based material by one or more methods of an acid treatment, an ozone treatment or air oxidation before mixing the carbon-based material with the coating material.

18. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein pitch comprising carbon black is used as the coating material.

19. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein natural graphite having a rhombohedral structure is used as the carbon-based material.

20. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein graphite powder with the tapping density of 1.0 g/cm^3 and more in tapping 40 times is used as the carbon-based material.

21. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein natural graphite with the tapping density of 0.9 g/cm^3 in tapping

20 times is used as the carbon-based material and the graphitization is performed at a temperature within the range of 200 °C to 2300 °C, both inclusive.

22. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein natural graphite with the tapping density of 0.9 g/cm^3 in tapping 40 times, on which pressing is performed, is used as the carbon-based material.

23. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein each of a negative electrode and a positive electrode has a structure in which a mixture containing an active material is formed on both sides of a band-shaped collector, and the battery is formed by stacking the negative electrode and the positive electrode with a separator made of a microporous film interposed therebetween, being spirally rolled a number of times.

24. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 23, wherein the positive electrode is formed to contain a lithium composite oxide expressed by LiM_xO_y (where M denotes at least one element selected from the group consisting of Co, Ni, Mn, Fe, Cr, Al and Ti).

25. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 22, wherein the pressing is performed with a pressure of 1 MPa and more.

26. (Withdrawn) A method of preparing a carbon-based material for a negative electrode including steps of:

I. applying a heat treatment in an oxidizing atmosphere on a carbon-based material made of at least either one of mesocarbon microbeads grown at a temperature within the range of the formation temperature to 2000 °C, both inclusive, and a carbon material; and

II. graphitizing the carbon-based material.

27. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 26, wherein natural graphite having a rhombohedral structure is used as the carbon-based material.

28. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 26, wherein graphite powder with the tapping density of 1.0 g/cm^3 and more in tapping 40 times is used as the carbon-based material.

29. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 26, wherein each of a negative electrode and a positive electrode has a structure in which a mixture containing an active material is formed on both sides of a band-shaped collector, and the battery is formed by stacking the negative electrode and the positive electrode with a separator made of a microporous film interposed therebetween, being spirally rolled a number of times.

30. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 29, wherein the positive electrode is formed to contain a lithium composite oxide expressed by LiM_xO_y (where M denotes at least one element selected from the group consisting of Co, Ni, Mn, Fe, Cr, Al and Ti).

31. (Withdrawn) A method of preparing a carbon-based material for a negative electrode including steps of:

I. mixing a coating material made of one of pitch containing free carbon, pitch with a quinoline insoluble matter content of 2 % and more, or polymer with a carbon-based material made of at least either one of mesocarbon microbeads grown at a temperature within the range of the formation temperature to 2000 °C, both inclusive, and a carbon material; and

II. graphitizing the carbon-based material to which the coating material is mixed;

III. wherein the step of mixing the coating material with the carbon-based material includes a step of applying a heat treatment to graphite particles in an inert atmosphere where more than a specific concentration of an organic substance is diffused.

32. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein the method is used in a manufacturing process of a secondary battery where each of a negative electrode and a positive electrode has a structure in which a mixture containing an active material is formed on both sides of band-shaped collector and the battery is formed by stacking the negative electrode and the positive electrode with a separator made of a microporous film interposed therebetween, being spirally rolled a number of times.

33. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein a benzenoid compound having a structure including at least one or more benzene rings is used as the organic substance.

34. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein a benzenoid compound having a structure including a bond of oxygen is used as the organic substance.

35. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 33, wherein either a nonbenzenoid compound, or a mixture of a nonbenzenoid compound and a benzenoid compound is contained as the organic substance.

36. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 34, wherein a compound in which a carbon atom (C) is replaced with another element is used as the benzenoid compound.

37. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein a benzenoid compound having at least one or more structures in which a carbon atom (C) is replaced with at least one element selected from the group consisting of sulfur (S), nitrogen (N) and phosphorus (P) is used as the benzenoid compound.

38. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31 including a step of forming the graphite particles by grinding artificial graphite or natural graphite.

39. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein an oxidation treatment is performed on the graphite particles by one or more methods of an acid treatment, an ozone treatment or air oxidation before the heat treatment.

40. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein natural graphite having a rhombohedral structure is used as the graphite particles.

41. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein graphite powder with the tapping density of 1.0 g/cm^3 and more in tapping 40 times is used as the graphite particles.

42. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 15, wherein natural graphite with the tapping density of 0.9 g/cm^3 and more in tapping 20 times is used as the carbon-based material, and the natural graphite is mechanically processed and pressing is performed thereon, and then a heat treatment is applied at a temperature within the range of 200°C to 2300°C , both inclusive.

43. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31 wherein natural graphite with the tapping density of 0.9 g/cm^3 and more in tapping 40 times is used as the carbon-based material, and the natural graphite is mechanically processed, and pressing is performed thereon, and then a heat treatment is applied at a temperature within the range of 200°C to 2300°C , both inclusive.

44. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 43, wherein the pressing is performed with a pressure of 1 MPa and more.

45. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 31, wherein the method is used in a manufacturing process of a secondary

battery where each of a negative electrode and a positive electrode has a structure in which a mixture containing an active material is formed on both sides of band-shaped collector and the battery is formed by stacking the negative electrode and the positive electrode with a separator made of a microporous film interposed therebetween, being spirally rolled a number of times.

46. (Withdrawn) A method of preparing a carbon-based material for a negative electrode as claimed in claim 45, wherein the positive electrode is formed to contain a lithium composite oxide expressed by LiM_xO_y (where M denotes at least one element selected from the group consisting of Co, Ni, Mn, Fe, Cr, Al and Ti).